



T0144-S PULSAR – a Software Defined Radio – S & X Band

Problem Statement

- PULSAR will provide NASA with a lightweight S&X-Band transponder that has unmatched data throughput at a significantly lower cost than industry
- This flight opportunity will allow PULSAR to achieve a TRL rating of 7 and provide evidence of its robust design
- Any NASA or US Gov. agency can use PULSAR on Small Satellites (approaching Cube sat size) or Launch vehicles or UAVs.

Technology Development Team

- PI: Dr. Herb Sims, ES63, HERB.SIMS@NASA.GOV
- PI: Kosta Varnavas, ES36, Kosta.Varnavas@nasa.gov
- Funding provided by Several Organizations at MSFC: ZP30, ZP20 and ES01
- Partners: HiDAQ, ORS-DARPA, Auburn University, Mil-Tec, Secretary of Defense

Proposed Flight Experiment

Experiment Readiness:

- PULSAR will be flight-ready on February 1, 2016.

Test Vehicles:

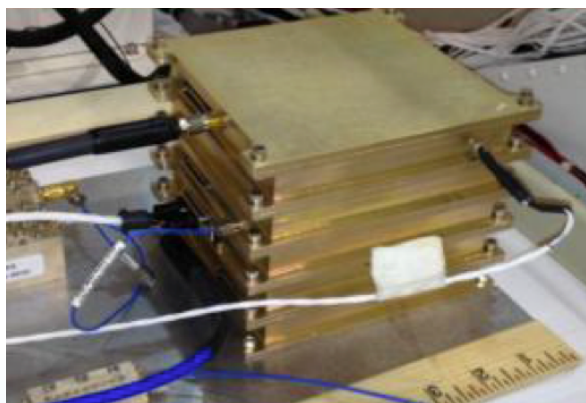
- PULSAR would like the opportunity to fly on a sounding rocket. PULSAR is currently negotiating with UP_Aerospace 11 for a flight.

Test Environment:

- Prior to this opportunity (Winter 2016), PULSAR has contracted for a high altitude balloon flight for the fall of 2015 (October/November). The Altitude should be greater than 80kft and is considered "Near-Space". The Flight should last 3 hours.

Test Apparatus Description:

- This image is of the PULSAR Payload



Technology Maturation

- TRL 7 Definition: System prototype demonstration in a space environment
- PULSAR is TRL 5 and about to undergo environmental testing: Vibration, Thermal/Vac & EMI.
- PULSAR is expected to be a TRL 6 after the fall 2015 Balloon Flight. (Currently TRL 5)

Objective of Proposed Experiment

- Receive a data stream at S and X-band frequencies during coast phase at a Bit Error Rate less than 1×10^{-6} for at least 20 seconds, at the apogee, at a distance greater than 100 km from the receiving antenna.
- Send at least two commands (S-band only) from the ground to PULSAR during the flight that can be detected as downlink telemetry.